



**State of Louisiana**

**Coastal Protection and Restoration  
Authority of Louisiana (CPRA)**

**2011/2012 Annual Inspection  
Report**

for

**HWY 384 HYDROLOGIC  
RESTORATION PROJECT  
(CS-21)**

State Project Number CS-21  
Priority Project List 2

February 23, 2012  
Cameron Parish

Prepared by:

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## **I. Introduction**

The Hwy. 384 Hydrologic Restoration project (State Project No. CS-21) is located in the Calcasieu-Sabine Basin on the northeast side of Calcasieu Lake in Cameron Parish. The 1,125 acre project area extends from the northeast shore of Calcasieu Lake in a southeasterly direction to the Gulf Intracoastal Waterway and generally parallels LA Hwy. 384 in the vicinity of the Grand Lake community. The area is bounded on the north and south by higher elevation prairie formations. (See Appendix A).

The Hwy. 384 Hydrologic Restoration Project was authorized by Section 303(a) of Title III Public Law 101-646, the Coastal Wetlands Planning Protection and Restoration Act (CWPPRA) enacted on November 29, 1990 as amended and approved on the second Priority Project List. The Hwy. 384 Project has a twenty –year (20 year) economic life, which began in January 2000.

## **II. Inspection Purpose and Procedures**

The purpose of the annual inspection of the Hwy. 384 Hydrologic Restoration Project (CS-21) is to evaluate the constructed project features to identify any deficiencies and prepare a report detailing the condition of project features and recommended corrective actions needed. Should it be determined that corrective actions are needed, CPRA shall provide, in the report, a detailed cost estimate for engineering, design, supervision, inspection, and construction contingencies, and an assessment of the urgency of such repairs (O&M Plan, 2003). The annual inspection report also contains a summary of maintenance projects, if any, which were completed since completion of constructed project features and an estimated projected budget for the upcoming three (3) years for operation, maintenance and rehabilitation. The three (3) year projected operation and maintenance budget is shown in Appendix C.

An inspection of the Hwy. 384 Hydrologic Restoration Project (CS-21) was held on February 23, 2012 under partly cloudy skies and mild temperatures. In attendance were Darrell Pontiff and Dion Broussard of CPRA, along with Loland Broussard representing NRCS. Parties left the Lafayette Field Office of CED, and proceeded to the CS-21 project area in the community of Grand Lake, LA. The annual inspection began at approximately 10:45 a.m. at Structure #1.

The field inspection included a complete visual inspection of all features. Staff gauge readings where available were used to determine approximate elevations of water, rock plugs, earthen embankments, and other project features. Photographs were taken at each project feature (see Appendix B) and Field Inspection notes were completed in the field to record measurements and deficiencies (see Appendix D).

### **III. Project Description and History**

Historically, the western portion of the project area was intermediate marsh with slightly brackish marsh immediately adjacent to Calcasieu Lake (U. S. Department of Agriculture, Natural Resources Conservation Service [USDA/NRCS] 1995, 1996a, 1996b). The eastern portion of the project area was fresh marsh up to the GIWW. In the late 1980's, Chabreck and Linscombe (1988) characterized the La. Highway 384 wetlands as brackish and intermediate.

Increased tidal volumes, enlargement of tidal exchange routes, and salt water intrusion resulting from human-induced changes to the area's hydrology are the primary causes of wetland loss in the project area (Louisiana Coastal Wetlands Conservation and Restoration Task Force [LCWCRTF] 1993). The Calcasieu Ship Channel was constructed in 1941 and redredged to its current depth of 40 ft (12.2 m) and bottom width of 400 ft (122 m) in 1968 (Good et al. 1995). This channel radically altered the area's hydrology by increasing the height and duration of tidal fluctuations, which in turn increased water levels and saltwater intrusion into the low salinity marshes surrounding Calcasieu Lake (Suhayda et al. 1988). Spoil banks along the GIWW, which was constructed in the 1940's, have effectively blocked the project area's historical connection to the Mermentau River Basin, and now block off the major source of freshwater for the project area, the GIWW east of Calcasieu Lock. Construction of a drainage canal through the project area prior to 1940, and construction of an oil field road before 1963 both provided hydrologic exchange points connecting the fragile interior marsh soils of the project area to Calcasieu Lake (USDA/NRCS 1995, 1996a, 1996b).

Hydrologic exchange between the project area and Calcasieu Lake allowed salt water to eradicate much of the non-salt tolerant emergent vegetation, exposing the fragile organic surface layer of the marsh soil to erosion and tidal scour. As a result, the organic surface layer has been largely transported out of the project area and into Calcasieu Lake. The loss in elevation of the soil surface provided by the organic surface layer of the soil has led to prolonged inundation of the emergent vegetation, which causes die-back of many wetland plant species (Mendelssohn and McKee 1988), and finally, the conversion of emergent marsh to open water (Gosselink et al. 1979).

Construction of the Hwy. 384 Hydrologic Restoration Project was completed in January 2000. Maintenance was performed on the road between La. Hwy. 384 and Calcasieu Lake in November 2000. Another maintenance project was done in May 2002. Site 8 was covered with dirt to seal off leakage from Calcasieu Lake into the project area. Also, rock was placed around Structure #1 to prevent further erosion around the structure and a hyacinth barrier was constructed between the Gulf Intracoastal Waterway and the structure. The project has a 20-year economic life which began in January 2000.

The principal project features include:

- Structure #1/Freshwater Introduction Structure - 3-24" Aluminum culverts with Interior 24" Flapgates and Exterior 24" Sluice Gates.

- Structure #12/Salinity Control Structure - 2-48" Aluminum culverts, each w/ an Interior 10' Variable-Crested Weir Inlet with a 4" vertical slot and an Exterior 48" Flapgate.
- Site #8 - Approximately 100 linear feet of earth fill and rock plug on the eastern shore of Calcasieu Lake.
- An existing access road, approximately 6,000 linear feet in length, which serves as a hydrologic boundary on the southeastern edge of the project boundary between La. Hwy. 384 and the Gulf Intracoastal Waterway.
- An existing access road, approximately 4,000 linear feet in length, which serves as a hydrologic boundary on the northwestern edge of the project boundary between La. Hwy 384 and Calcasieu Lake.

#### **IV. Summary of Past Operation and Maintenance Projects**

**General Maintenance:** Several maintenance projects have been completed since the original project's construction completion. Engineering and design as well as construction oversight on some of these maintenance projects were provided by Abbeville/Lafayette field office personnel so no exact costs related to these activities are available. The maintenance projects that were performed were as follows:

##### **Nov. 2000- Glenn Lege Construction**

- Placed 40.32 cy. of #610 limestone on the road near Structure #12 due to some overtopping of the road during high tidal events
- Placed 12 cy. of man size rip-rap on the inlet side of Structure #12 due to some scouring of the bankline around the structure.

**TOTAL CONSTRUCTION COST-        \$3,461.14**

##### **June 2002- Glenn Lege Construction**

- Provided labor and materials to construct a "hyacinth fence" on the inlet side of Structure #1. The fence is constructed of galvanized woven wire and CCA treated timber piles and whalers.
- Provided labor and materials to reinforce the existing levee around Structure #1 with graded crushed stone.
- Provided labor and materials to repair the rock plug at Site #8 that had been leaking and also had been vandalized. The plug was repaired by hauling in earth fill from an off-site location and pushing it over the existing rock plug with a bulldozer. The earthen plug was then planted under separate contract by DNR plantings group.

**TOTAL CONSTRUCTION COST-        \$14,386.87**

**February 2004 – Lonnie G. Harper and Associates**

Provided a survey of the existing shoreline to determine lake rim elevations within the project area along the eastern side of Calcasieu Lake.

**TOTAL COST- \$3,345.00**

**May 2005- Bertucci Construction**

Provided labor, material and equipment to repair thirteen linear feet of the rock plug at site #8. The rock was removed by vandals. 39.9 tons of 1200# rip rap stone was used to repair the thirteen foot gap. A four foot thick layer of 150# stone was applied to the marsh side slope of the plug to prevent water flow through the plug. This required 343.4 tons of rock. Completion and final acceptance was on May 15, 2005.

**TOTAL CONSTRUCTION COST- \$45,090.00**

**May 2006- F. Miller & Sons**

Provided labor, material and equipment to repair the existing access roads to permit elevations (+3.0 on Roadway No.1 West side of Hwy 384, +2.5 on Roadway No. 2, East side of Hwy 384). Approximately 3,225 tons of recycled concrete were used to elevate the roadways. Two Portable Multi-Parameter Water Quality Troll 9500 units were provided through this contract and installed by Simon & DeLany for operation of Structures No. 1 and No. 12. Completion and final acceptance was on June 28, 2006.

Engineering, Design ,Surveying,	
Construction Oversight & As-Builts	\$ 26,705.00
Construction Cost	\$150,000.00

**TOTAL CONSTRUCTION COST \$176,705.00**

**June 2006 – F. Miller & Sons**

Provide labor, material and equipment to refurbish and install flap gate on west culvert of Structure No. 12. This flap gate was vandalized during spring of 2006. Completion and final acceptance was on June 28, 2006.

**TOTAL CONSTRUCTION COST \$1,600.00**

**March 2007 – Simon & Delany**

Provide labor necessary to remove and dispose of trash and debris which has accumulated within the hyacinth fence and adjacent to the sluice gates at Structure No.1

**TOTAL CONSTRUCTION COST            \$900.00**

**May 2010 – Simon & Delany**

Provide labor necessary to remove and dispose of trash and debris which has accumulated within the hyacinth fence and adjacent to the sluice gates at Structure No.1

**TOTAL CONSTRUCTION COST            \$2,000.00**

**October 2011 – Simon & Delany**

Provide labor necessary to install bird excluder devices on the solar panels and install plastic pile caps on Structures No. 1 and No. 12.

**TOTAL CONSTRUCTION COST            \$1,300.00**

**Structure Operations:** In accordance with the operation schedule outlined in the Operation and Maintenance Plan and USACE Permit, structures were manipulated as required by Simon & DeLany, Resource Management personnel who are under contract with DNR since 2005. Copies of the quarterly reports that are provided as well as a copy of the operations contract between DNR and Simon & DeLany are attached in the “Structure Operations” section of the CS-21 Hwy. 384 Operation & Maintenance Plan. The original operating procedures for the #1 Structure was based on water level only, there was no provision for salinity control. Records for the structure showed salinities of 9+ ppt. The procedure was modified to close the #1 Structure sluice gates at 7 ppt. Operations for the #12 Structure was not changed. To view the real time conditions at #1 or #12 Structures log on to [www.isi-data.com](http://www.isi-data.com) and use ocprguest for both the username and pass word. 15r is for structure #12 and 29r for structure #1.

## **V.     Inspection Results**

### **Structure #1**

The structure is in good condition. The inside staff gage will need to be replaced. Rock placed on the bank during the maintenance event of June 2002 is stable and in no need of repair. The galvanized pile caps were recently replaced with plastic pile cap covers.

Water was flowing from the GIWW into the project area. All three gates were open and flap gates were flapping open. The operations contractor was contacted to check the three flap gates to ensure there were no obstructions such that they did not appear to be fully open. The hyacinth fence is in good condition. There is some trash accumulation in front of the hyacinth fence. This condition will be monitored and addressed if flow restriction becomes an issue. In addition the contract operator will submit a cost estimate to clean out the inlet side of the channel near the hyacinth fence. The road/levee leading up to the structure is in good condition since it was repaired in June 2006. The recently installed Portable Multi-Parameter Water Quality Troll 9500 – 29r operation sonde was operational, however on March 28, 2012 this office was notified by Chris Simon that the sonde had been vandalised. The solar panel, box cover and battery had been stolen. These items will need to be addressed. (Photos: Appendix B, Photos 1-3).

A supplemental site visit was conducted by CPRA and NRCS on May 21, 2012 to investigate levee erosion north of Structure #1 as requested by land owner, Buck Stevenson, and rice farmer Charles Precht. It was discovered that a section of levee approximately 86 feet in length has been washed out and is very low in elevation (near marsh level). There are also other sections of the levee that appear low and may be subject to overtopping in the future. These areas need to be addressed. (Photos: Appendix B, Photos 9-10).

### **Structure #12**

The structure is in good shape and the inlet and outlet sides appear undamaged. Water level on the outside was elevation +1.5 NAVD88 and the level inside was +1.7 NAVD88, and water was flowing from the interior to the lake side. Pile caps on the outlet side and inlet side have recently been replaced with plastic pile cap covers. Some of the lower anchor bolts on the structure show signs of corrosion and will be monitored. Rock that was placed during the maintenance of Nov. 2000 is stable. The road/levee leading up to the structure is in good condition since it was repaired in June 2006. (Photos: Appendix B, Photos 4-5).

### **Site #8**

The rock plug is in good condition. It was determined by both NRCS and CPRA that the staff gages at this location do not need to be replaced such that there is no flow through this structure and the lake side has silted in and is covered with vegetation. The completed maintenance work in May 2005 to repair the plug from vandalism held up well under the high storm surge waters experienced during Hurricanes Rita and Ike. The interior area of the rock plug is showing signs of new vegetative growth in locations that were previously open water. The lakeside of the rock plug is also vegetating and is almost completely filled in. (Photos: Appendix B, Photos 6-8).

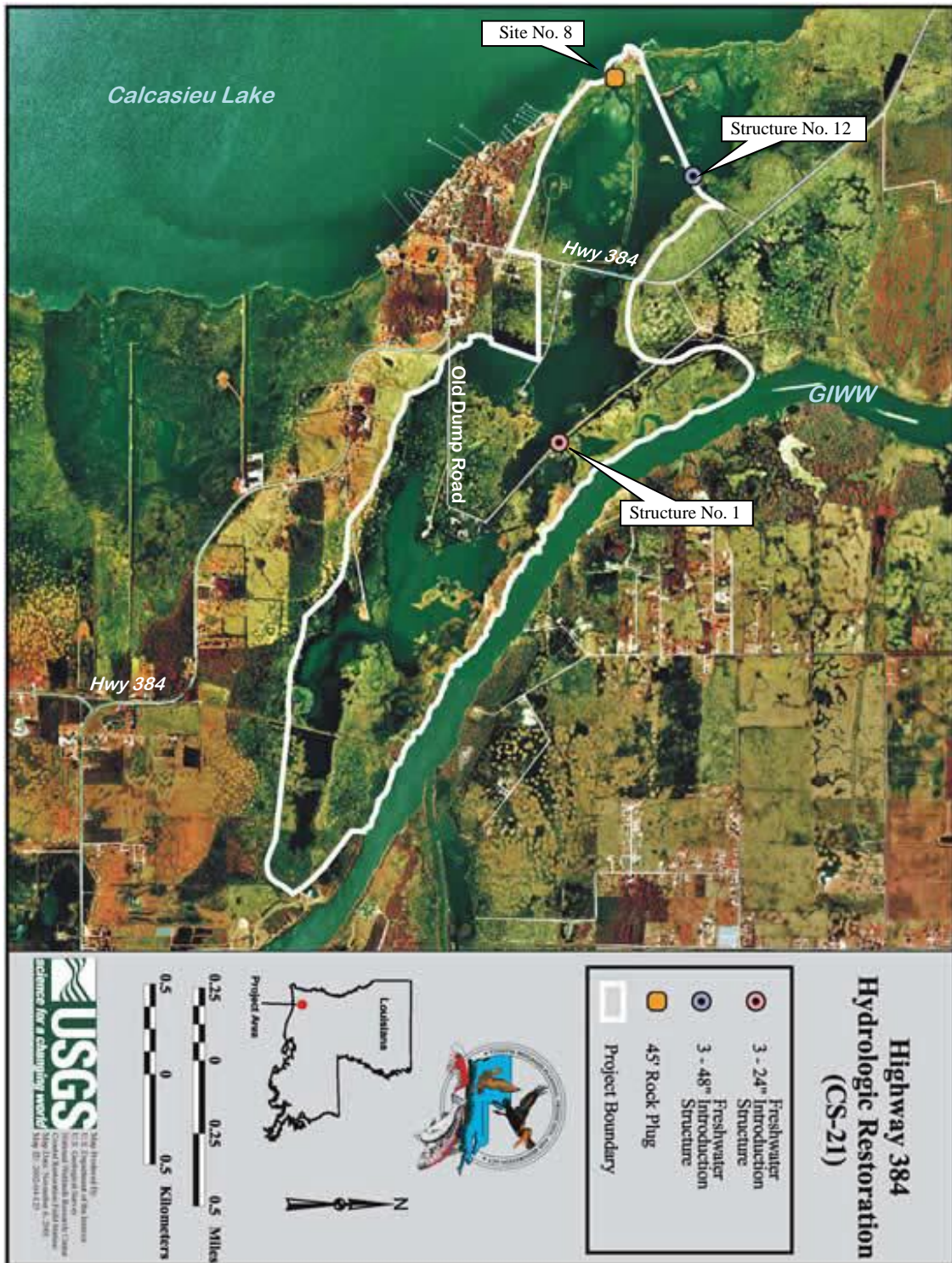


## **VI. Conclusions and Recommendations**

Overall, the Hwy. 384 Hydrologic Restoration Project is in good condition and functioning as designed with only minor problems noted. The hyacinth fence that was installed during the maintenance project of June 2002 as well as the rock reinforcement of the bankline is performing well and should be incorporated into all structures of this type in the future. The access road repair with recycled concrete material turned out well and was economical. The two Portable Multi-Parameter Water Quality Troll 9500 units used for operation of this project work very well and should be considered for future projects. Based on this year's inspection and supplemental site visit maintenance will be required at Structure No.1 as listed below:

- Replace staff gage.
- Repair vandalism.
- Repair/elevate levee.
- Clean out inlet channel.

**Appendix A**  
**Project Features Map**



## **Appendix B**

### **Photographs**





**Photo No. 1,** Structure No.1, inlet side.



**Photo No. 2,** Structure No.1, hyacinth fence and operations equipment





**Photo No.3**, Structure No.1, outlet side, flapgates open



**Photo No. 4**, Structure No. 12, inlet side.





**Photo No. 5, Structure No. 12, outlet side.**



**Photo No. 6, Site No. 8, rock plug looking south**





**Photo No. 7,** Site No. 8, rock plug showing vegetation lakeside



**Photo No. 8,** Site No. 8, rock plug showing vegetation on the interior





**Photo No. 9,** Levee erosion north of Str. No. 1.



**Photo No. 10,** Levee erosion north of Str. No. 1, view looking towards marsh.

## **Appendix C**

### **Three Year Budget Projection**

Annual Inspection Report  
HWY. 384 HYDROLOGIC RESTORATION PROJECT  
State Project No. CS-21

**HWY 384/ CS-21 / PPL 2**  
**Three-Year Operations & Maintenance Budgets 07/01/2012 - 06/30/2015**

<u>Project Manager</u>	<u>O &amp; M Manager</u>	<u>Federal Sponsor</u>	<u>Prepared By</u>
Pat Landry	Darrell Pontiff	NRCS	Darrell Pontiff

	2012/2013 (-13)	2013/2014 (-14)	2014/2015 (-15)
<b>Maintenance Inspection</b>	\$ 6,269.00	\$ 6,457.00	\$ 6,651.00
<b>Structure Operation</b>	\$ 10,600.00	\$ 11,600.00	\$ 12,600.00
<b>State Administration</b>			\$ -
<b>Federal Administration</b>			\$ -

**Maintenance/Rehabilitation**

12/13 Description:

E&D	
Construction	
Construction Oversight	
Sub Total - Maint. And Rehab.	\$ -

13/14 Description:

E&D	\$ -
Construction	
Construction Oversight	
Sub Total - Maint. And Rehab.	\$ -

14/15 Description:

E&D	\$ -
Construction	\$ -
Construction Oversight	\$ -
Sub Total - Maint. And Rehab.	\$ -

	2012/2013 (-13)	2013/2014 (-14)	2014/2015 (-15)
<b>Total O&amp;M Budgets</b>	<b>\$ 16,869.00</b>	<b>\$ 18,057.00</b>	<b>\$ 19,251.00</b>

<b>O &amp; M Budget (3 yr Total)</b>	<b>\$ 54,177.00</b>
<b>Unexpended O &amp; M Budget</b>	<b>\$ 114,654.00</b>
<b>Remaining O &amp; M Budget (Projected)</b>	<b>\$ 60,477.00</b>

**Appendix D**  
**Field Inspection Form**

# Annual Inspection Report

## HWY. 384 HYDROLOGIC RESTORATION PROJECT

### State Project No. CS-21

#### MAINTENANCE INSPECTION REPORT CHECK SHEET

Project No. / Name: CS-21 Hwy. 384

Date of Inspection: February 23, 2012 Time: 10:45 am

Structure No. 1

Inspector(s): Darrell Pontiff, Dion Broussard-(CPRA)

Loland Broussard - NRCS

Structure Description: 3-24" Culverts

Water Level: Inside Outside +1.7

Type of Inspection: Annual

Weather Conditions: Partly cloudy and mild

Item	Condition	Physical Damage	Corrosion	Photo #	Observations and Remarks
Steel Bulkhead / Caps	N/A				
Flapgates/Outlet Pipe	Good			3	Water was flowing through the structure. Flaps were slightly open. Will contact the operator to check for any obstructions.
Stop Logs	N/A				
Hardware/Sluiceways	Good			1	All 3 gates were open and flowing water.
Hyacinth Fence	Good			2	Some trash accumulating, will continue to monitor.
Timber Piles	Good				
Timber Wales	N/A				
Plastic Pile Caps	Good				
Cables	N/A				
Signage /Supports	N/A				
Staff Gages	Poor				Staff gage outlet side of structure needs to be replaced.
Rip Rap (fill)	Good				
WQ Troll 9500 - 29r	Good				
Earthen Embankment	Fair			9,10	Levee north of Str. No. 1 has washed out and is overtopped at high tides. (Supplemental visit 5-21-12)
Access Roadway	Good				

What are the conditions of the existing levees?  
 Are there any noticeable breaches?  
 Settlement of rock plugs and rock weirs?  
 Position of stoplogs at the time of the inspection?  
 Are there any signs of vandalism?

#### MAINTENANCE INSPECTION REPORT CHECK SHEET

Project No. / Name: CS-21 Hwy. 384

Date of Inspection: February 23, 2012 Time: 11:30 am

Structure No. 8

Inspector(s): Darrell Pontiff, Dion Broussard-(CPRA)

Loland Broussard - NRCS

Structure Description: Rock plug

Water Level: Inside Outside

Type of Inspection: Annual

Weather Conditions: Partly cloudy and mild

Item	Condition	Physical Damage	Corrosion	Photo #	Observations and Remarks
Steel Bulkhead / Caps	N/A				
Steel Grating	N/A				
Stop Logs	N/A				
Hardware	N/A				
Timber Piles	N/A				
Timber Wales	N/A				
Galv. Pile Caps	N/A				
Cables	N/A				
Signage /Supports	N/A				
Staff Gages	Poor				Both staff gages missing, it was decided not to replace either one.
Rip Rap (fill) (foreshore dike)	Good			6, 7 8	Lakeside area is silting in and vegetating. Interior also is vegetating.
Earthen Embankment	Good				The earthen levee that was rebuilt as part of the May '02 maintenance is in excellent condition beyond the limits of the channel.

What are the conditions of the existing levees?  
 Are there any noticeable breaches?  
 Settlement of rock plugs and rock weirs?  
 Position of stoplogs at the time of the inspection?  
 Are there any signs of vandalism?

Annual Inspection Report  
HWY. 384 HYDROLOGIC RESTORATION PROJECT  
State Project No. CS-21

MAINTENANCE INSPECTION REPORT CHECK SHEET

Project No. / Name: CS-21 Hwy. 384

Date of Inspection: February 23, 2012

Time: 11:20 am

Structure No. 12

Inspector(s): Darrell Pontiff, Dion Broussard-(CPRA)

Loland Broussard - NRCS

Structure Description: 2-48" Culverts

Water Level: Inside +1.7 Outside +1.5

Type of Inspection: Annual

Weather Conditions: Partly cloudy and mild

Item	Condition	Physical Damage	Corrosion	Photo #	Observations and Remarks
Steel Bulkhead / Caps	N/A				
Steel Grating	Good			4	
Stop Logs	Good				Measurements from top of stoplog to water surface, from east to west, 3.4', 3.5', 2.6, 3.0' Corresponding stoplog elevations, -1.7, -1.8, -0.9, -1.3 Water was flowing from within the project area to the lakeside.
Hardware/Flapgates	Good				
Timber Piles	Good				
Timber Wales	N/A				
Plastic Pile Caps	Good			5	Galv. pile caps on inlet and outlet structure recently replaced with plastic pile caps.
Cables	N/A				
Signage /Supports	N/A				
Staff Gages	Good				
Rip Rap (fill)	Good				
WQ Troll 9500 - 15r	Good				
Earthen Embankment					
Access Roadway	Good				

What are the conditions of the existing levees?

Are there any noticeable breaches?

Settlement of rock plugs and rock weirs?

Position of stoplogs at the time of the inspection?

Are there any signs of vandalism?